

## **AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently amended) A k-th order component generating circuit, characterized by comprising:

a plurality  $i$  ( $i$  is an integer of 5 or more) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant level signal generating circuit for providing the constant level signal to each of the  $i$  differential amplifiers, wherein:

first, second and third differential amplifiers of the  $i$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of  $(i - 4)$  differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $i$  differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the  $(i - 4)$  differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a  $k$ -th order function ( $k$  is an odd number of 3 or more) on adding up the output signals of the first, second, third and  $(i - 4)$  differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the  $k$ -th order function component so as to generate the component of the  $k$ -th order function including no linear component by adding the output signals of the  $i$  differential amplifiers.

2. (Currently amended) The ~~cubic order~~  $k$ -th order component generating circuit according to claim 1, ~~characterized by being~~ wherein the circuit is a cubic order generating circuit set as  $i = 5$  and  $k = 3$ .

3. (Currently amended) The ~~cubic order~~  $k$ -th order component generating circuit according to claim 2, ~~characterized in that~~ wherein a fifth differential amplifier has the constant level signal to be inputted set to be lower than the level of the constant level signal to be inputted to the first differential amplifier and also has the range of the input signal to be the maximum value and the input signal to be the minimum value set smaller than that of the first differential amplifier.

4. (Currently amended) The ~~cubic-order~~ k-th order component generating circuit according to claim 2, ~~characterized in that the~~ wherein a fifth differential amplifier has the constant level signal to be inputted set to be higher than the level of the constant level signal to be inputted to the third differential amplifier and also has the range of the input signal to be the maximum value and the input signal to be the minimum value set smaller than that of the third differential amplifier.

5. (Currently amended) The ~~fifth~~ k-th order component generating circuit according to claim 1, ~~characterized by being~~ wherein the circuit is a fifth order component generating circuit set as  $i = 6$  and  $k = 5$ .

6. (Currently amended) The ~~fifth~~ k-th order component generating circuit according to claim 5, ~~characterized in that the~~ wherein a fifth differential amplifier has the constant level signal to be inputted set to be lower than the level of the constant level signal to be inputted to the first differential amplifier and also has the range of the input signal to be the maximum value and the input signal to be the minimum value set smaller than that of the first differential amplifier, and the sixth differential amplifier has the constant level signal to be inputted set to be higher than the level of the constant level signal to be inputted to the third differential amplifier and also has the range of the input signal to be the maximum value and the input signal to be the minimum value set smaller than that of the third differential amplifier.

7. (Currently amended) An  $m$ -th order component generating circuit, ~~characterized by comprising:~~

a plurality  $j$  ( $j$  is an integer of 4 or more) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal

of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant signal outputting circuit for outputting a constant output signal;

a constant level signal generating circuit for providing the constant level signal to each of the  $j$  differential amplifiers, wherein:

first, second, third and fourth differential amplifiers of the  $j$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order;

the output signals of the first and second differential amplifiers and those of the third and fourth differential amplifiers are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of an  $m$ -th order function ( $m$  is an even number of 4 or more) on adding up the output signals of the  $j$  differential amplifiers; and

the constant signal outputting circuit is constituted to form the output signal of a 0-th order component for offsetting the 0-th order component of the  $m$ -th order function component so as to generate the component of the  $m$ -th order function including no 0-th order component by adding the output signals of the  $j$  differential amplifiers and the constant signal outputting circuit.

8. (Currently amended) The  $m$ -th order component generating circuit according to claim 7, ~~characterized in that~~ wherein  $j$  is an even number of 6 or more, and each of  $(j - 4)$  differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $j$  differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to

the first differential amplifier or higher than a level of the constant level signal to be inputted to the fourth differential amplifier.

9. (Currently amended) The ~~fourth~~ m-th order component generating circuit according to claim 7, ~~characterized by being~~ wherein the circuit is a fourth order component generating circuit set as  $j = 4$  and  $m = 4$ .

10. (Currently amended) An approximate n-th order function generating device, ~~characterized by~~ comprising:

a 0-th order component generating portion for having a constant signal inputted and generating a constant component;

a linear component generating portion for having a linear input signal inputted and generating a linear component;

at least one k-th order component generating portion having a k-th order component (k is an odd number of 3 or more) generating circuit for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the k-th order component generating circuit inputted;

at least one m-th order component generating portion having an m-th order component (m is an even number of 4 or more) generating circuit for having the linear input signal inputted and a second variable gain amplifying circuit for having an output signal of the m-th order component generating circuit inputted; and

an adding circuit for adding the output signals of the 0-th order component generating portion, the linear component generating portion, the k-th order component generating portion and the m-th order component generating portion, wherein an approximate n-th order function (n is an integer of 4 or more) is generated.

11. (Currently amended) An approximate n-th order function generating device, characterized by comprising:

a 0-th order component generating portion for having a constant signal inputted and generating a constant component;

a linear component generating portion for having a linear input signal inputted and generating a linear component;

at least one k-th order component generating portion having a k-th order component (k is an odd number of 3 or more) generating circuit comprising:

a plurality i (i is an integer of 5 or more) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant level signal generating circuit for providing the constant level signal to each of the i differential amplifiers, wherein:

first, second and third differential amplifiers of the i differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the i differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers

and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of (i - 4) differential amplifiers other than the first, second, third and fourth differential amplifiers of the i differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the (i - 4) differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a k-th order function (k is an odd number of 3 or more) on adding up the output signals of the first, second, third and (i - 4) differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the k-th order function component so as to generate the component of the k-th order function including no linear component by adding the output signals of the i differential amplifiers according to claim 4 for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the k-th order component generating circuit inputted;

at least one m-th order component generating portion having an m-th order component (m is an even number of 4 or more) generating circuit comprising:

a plurality j (j is an integer of 4 or more) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or

non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant signal outputting circuit for outputting a constant output signal;

a constant level signal generating circuit for providing the constant level signal to each of the j differential amplifiers, wherein:

first, second, third and fourth differential amplifiers of the j differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order;

the output signals of the first and second differential amplifiers and those of the third and fourth differential amplifiers are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of an m-th order function (m is an even number of 4 or more) on adding up the output signals of the j differential amplifiers; and

the constant signal outputting circuit is constituted to form the output signal of a 0-th order component for offsetting the 0-th order component of the m-th order function component so as to generate the component of the m-th order function including no 0-th order component by adding the output signals of the j differential amplifiers and the constant signal outputting circuit according to claim 7 for having the linear input signal inputted and a second variable gain amplifying circuit for having an output signal of the m-th order component generating circuit inputted; and

an adding circuit for adding the output signals of the 0-th order component generating portion, the linear component generating portion, the k-th order component generating portion and the m-th order component generating portion, wherein an approximate n-th order function (n is an integer of 4 or more) is generated.



12. (Currently amended) An approximate cubic function generating device, ~~characterized by~~ comprising:

a 0-th order component generating portion for having a constant input signal inputted and generating a constant component;

a linear component generating portion for having a linear input signal inputted and generating a linear component;

a cubic component generating portion having a cubic component generating circuit comprising:

a plurality  $i$  ( $i = 5$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant level signal generating circuit for providing the constant level signal to each of the  $i$  differential amplifiers, wherein:

first, second and third differential amplifiers of the  $i$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers

and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of  $(i - 4)$  differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $i$  differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the  $(i - 4)$  differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a  $k$ -th order function ( $k = 3$ ) on adding up the output signals of the first, second, third and  $(i - 4)$  differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the  $k$ -th order function component so as to generate the component of the  $k$ -th order function including no linear component by adding the output signals of the  $i$  differential amplifiers according to either claim 2 or claim 4 for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the cubic component generating circuit inputted;

and

an adding circuit for adding the output signals of the 0-th order component generating portion, the linear component generating portion and the cubic component generating portion.

13. (Currently amended) An approximate fourth order function generating device, ~~characterized by~~ comprising:

- a 0-th order component generating portion for having a constant input signal inputted and generating a constant component;
- a linear component generating portion for having a linear input signal inputted and generating a linear component;

- a cubic component generating portion having a cubic component generating circuit comprising:

- a plurality  $i$  ( $i = 5$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

- a constant level signal generating circuit for providing the constant level signal to each of the  $i$  differential amplifiers, wherein:

- first, second and third differential amplifiers of the  $i$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

- a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers

and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of  $(i - 4)$  differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $i$  differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the  $(i - 4)$  differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a  $k$ -th order function ( $k = 3$ ) on adding up the output signals of the first, second, third and  $(i - 4)$  differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the  $k$ -th order function component so as to generate the component of the  $k$ -th order function including no linear component by adding the output signals of the  $i$  differential amplifiers according to either claim 2 or claim 4 for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the cubic component generating circuit inputted;

a fourth order component generating portion having a fourth order component generating circuit comprising:

a plurality  $j$  ( $j = 4$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the

linear input signal and having a limiter function of limiting an output signal to

predetermined maximum and minimum values; and

a constant signal outputting circuit for outputting a constant output signal;

a constant level signal generating circuit for providing the constant level signal to each of the  $j$  differential amplifiers, wherein:

first, second, third and fourth differential amplifiers of the  $j$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order;

the output signals of the first and second differential amplifiers and those of the third and fourth differential amplifiers are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of an  $m$ -th order function ( $m = 4$ ) on adding up the output signals of the  $j$  differential amplifiers; and

the constant signal outputting circuit is constituted to form the output signal of a 0-th order component for offsetting the 0-th order component of the  $m$ -th order function component so as to generate the component of the  $m$ -th order function including no 0-th order component by adding the output signals of the  $j$  differential amplifiers and the constant signal outputting circuit according to claim 9 for having the linear input signal inputted and a second variable gain amplifying circuit for having an output signal of the fourth order component generating circuit inputted; and

an adding circuit for adding the output signals of the fourth order component generating portion, the cubic component generating portion, the linear component generating portion and the 0-th order component generating portion.

14. (Currently amended) An approximate fifth order function generating device, ~~characterized by~~ comprising:

a 0-th order component generating portion for having a constant input signal inputted and generating a constant component;

a linear component generating portion for having a linear input signal inputted and generating a linear component;

a cubic component generating portion having a cubic component generating circuit comprising:

a plurality  $i$  ( $i = 5$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant level signal generating circuit for providing the constant level signal to each of the  $i$  differential amplifiers, wherein:

first, second and third differential amplifiers of the  $i$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of (i - 4) differential amplifiers other than the first, second, third and fourth differential amplifiers of the i differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the (i - 4) differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a k-th order function (k = 3) on adding up the output signals of the first, second, third and (i - 4) differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the k-th order function component so as to generate the component of the k-th order function including no linear component by adding the output signals of the i differential amplifiers according to either claim 2 or claim 4 for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the cubic component generating circuit inputted;

a fourth order component generating portion having a fourth order component generating circuit comprising:

a plurality j (j = 4) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant signal outputting circuit for outputting a constant output signal;  
a constant level signal generating circuit for providing the constant level signal to  
each of the j differential amplifiers, wherein:  
first, second, third and fourth differential amplifiers of the j differential amplifiers  
are set to have the constant level signals at increasingly higher levels inputted in order;  
the output signals of the first and second differential amplifiers and those of the  
third and fourth differential amplifiers are set to be of mutually reverse polarity; and  
thus constituted to form the output signal of the component of an m-th order  
function ( $m = 4$ ) on adding up the output signals of the j differential amplifiers; and  
the constant signal outputting circuit is constituted to form the output signal of a  
0-th order component for offsetting the 0-th order component of the m-th order function  
component so as to generate the component of the m-th order function including no 0-th  
order component by adding the output signals of the j differential amplifiers and the  
constant signal outputting circuit according to claim 9 for having the linear input signal  
inputted and a second variable gain amplifying circuit for having an output signal of the  
fourth order component generating circuit inputted;  
a fifth order component generating portion having a fifth order component  
generating circuit comprising:  
a plurality i ( $i = 6$ ) of differential amplifiers for having a common linear input signal  
inputted to one input terminal, having a constant level signal of a predetermined level  
inputted to the other input terminal, outputting an reversed or non-reversed signal to the  
linear input signal and having a limiter function of limiting an output signal to  
predetermined maximum and minimum values; and



a constant level signal generating circuit for providing the constant level signal to each of the  $i$  differential amplifiers, wherein:

first, second and third differential amplifiers of the  $i$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of  $(i - 4)$  differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $i$  differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the  $(i - 4)$  differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a  $k$ -th order function ( $k = 5$ ) on adding up the output signals of the first, second, third and  $(i - 4)$  differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the k-th order function component so as to generate the component of the k-th order function including no linear component by adding the output signals of the i differential amplifiers according to claim 5 or 6 for having the linear input signal inputted and a third variable gain amplifying circuit for having an output signal of the fifth order component generating circuit inputted; and

an adding circuit for adding the output signals of the fifth order component generating portion, the fourth order component generating portion, the cubic component generating portion, the linear component generating portion and the 0-th order component generating portion.

15. (Currently amended) An approximate n-th order function generating device, ~~characterized by having the~~ comprising means for inputting a linear input signal inputted, and means for outputting an n-th output signal proportional to an n-th order function represented by an n-th order polynomial and including no second order term in the n-th order polynomial, wherein n is an integer of 4 or more.

16. (Currently amended) A temperature function generating circuit, ~~characterized by comprising a temperature detecting circuit and [[the]] an~~ approximate n-th order function generating device comprising means for inputting a linear input signal, and means for outputting an n-th output signal proportional to an n-th order function represented by an n-th order polynomial and including no second order term in the n-th order polynomial, wherein n is an integer of 4 or more according to claim 15 for having a detection signal of the temperature detecting circuit inputted.

17. (Currently amended) A temperature compensation crystal oscillation circuit, ~~characterized by~~ comprising ~~[[the]]~~ a temperature function generating circuit comprising a temperature detecting circuit and an approximate n-th order function generating device comprising means for inputting a linear input signal, and means for outputting an n-th output signal proportional to an n-th order function represented by an n-th order polynomial and including no second order term in the n-th order polynomial, wherein n is an integer of 4 or more ~~according to claim 16~~ and a crystal oscillation circuit for having the approximate n-th order function generated in the temperature function generating circuit inputted.

18. (Currently amended) A temperature function generating circuit, ~~characterized by~~ comprising a temperature detecting circuit and ~~[[the]]~~ an approximate n -th order function generating device comprising:

a 0-th order component generating portion for having a constant signal inputted and generating a constant component;

a linear component generating portion for having a linear input signal inputted and generating a linear component;

at least one k-th order component generating portion having a k-th order component (k is an odd number of 3 or more) generating circuit for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the k-th order component generating circuit inputted;

at least one m-th order component generating portion having an m-th order component (m is an even number of 4 or more) generating circuit for having the linear

input signal inputted and a second variable gain amplifying circuit for having an output signal of the m-th order component generating circuit inputted; and

an adding circuit for adding the output signals of the 0-th order component generating portion, the linear component generating portion, the k-th order component generating portion and the m-th order component generating portion, wherein an approximate n-th order function (n is an integer of 4 or more) is generated according to claim 10 or 11 for having a detection signal of the temperature detecting circuit inputted.

19. (Currently amended) A temperature compensation crystal oscillation circuit, ~~characterized by~~ comprising ~~[[the]]~~ a temperature function generating circuit comprising:

a 0-th order component generating portion for having a constant signal inputted and generating a constant component;

a linear component generating portion for having a linear input signal inputted and generating a linear component;

at least one k-th order component generating portion having a k-th order component (k is an odd number of 3 or more) generating circuit for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the k-th order component generating circuit inputted;

at least one m-th order component generating portion having an m-th order component (m is an even number of 4 or more) generating circuit for having the linear input signal inputted and a second variable gain amplifying circuit for having an output signal of the m-th order component generating circuit inputted; and

an adding circuit for adding the output signals of the 0-th order component generating portion, the linear component generating portion, the k-th order component generating portion and the m-th order component generating portion, wherein an approximate n-th order function (n is an integer of 4 or more) is generated for having a detection signal of the temperature detecting circuit inputted according to claim 18 and a crystal oscillation circuit for having the approximate n-th order function generated in the temperature function generating circuit inputted.

20. (Currently amended) A temperature function generating circuit, characterized by comprising a temperature detecting circuit and ~~[[the]]~~ an approximate cubic function generating device comprising:

a 0-th order component generating portion for having a constant input signal inputted and generating a constant component;

a linear component generating portion for having a linear input signal inputted and generating a linear component;

a cubic component generating portion having a cubic component generating circuit comprising:

a plurality i ( $i = 5$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant level signal generating circuit for providing the constant level signal to each of the i differential amplifiers, wherein:

first, second and third differential amplifiers of the  $i$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of  $(i - 4)$  differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $i$  differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the  $(i - 4)$  differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a  $k$ -th order function ( $k = 3$ ) on adding up the output signals of the first, second, third and  $(i - 4)$  differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the  $k$ -th order function component so as to generate the component of the  $k$ -th order function including no linear component

by adding the output signals of the i differential amplifiers for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the cubic component generating circuit inputted;

and

an adding circuit for adding the output signals of the 0-th order component generating portion, the linear component generating portion and the cubic component generating portion according to claim 12 for having a detection signal of the temperature detecting circuit inputted.

21. (Currently amended) A temperature compensation crystal oscillation circuit, ~~characterized by~~ comprising ~~[[the]]~~ a temperature function generating circuit comprising a temperature detecting circuit and an approximate cubic function generating device comprising:

a 0-th order component generating portion for having a constant input signal inputted and generating a constant component;

a linear component generating portion for having a linear input signal inputted and generating a linear component;

a cubic component generating portion having a cubic component generating circuit comprising:

a plurality i ( $i = 5$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant level signal generating circuit for providing the constant level signal to each of the  $i$  differential amplifiers, wherein:

first, second and third differential amplifiers of the  $i$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of  $(i - 4)$  differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $i$  differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the  $(i - 4)$  differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a  $k$ -th order function ( $k = 3$ ) on adding up the output signals of the first, second, third and  $(i - 4)$  differential amplifiers; and



the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the k-th order function component so as to generate the component of the k-th order function including no linear component by adding the output signals of the i differential amplifiers for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the cubic component generating circuit inputted;

and

an adding circuit for adding the output signals of the 0-th order component generating portion, the linear component generating portion and the cubic component generating portion according to claim 20 and a crystal oscillation circuit for having the approximate cubic function generated in the temperature function generating circuit inputted.

22. (Currently amended) A temperature function generating circuit, characterized by comprising a temperature detecting circuit and ~~[[the]]~~ an approximate fourth order function generating device comprising:

a 0-th order component generating portion for having a constant input signal inputted and generating a constant component;

a linear component generating portion for having a linear input signal inputted and generating a linear component;

a cubic component generating portion having a cubic component generating circuit comprising:

a plurality i ( $i = 5$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level

inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant level signal generating circuit for providing the constant level signal to each of the  $i$  differential amplifiers, wherein:

first, second and third differential amplifiers of the  $i$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of  $(i - 4)$  differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $i$  differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the  $(i - 4)$  differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a k-th order function ( $k = 3$ ) on adding up the output signals of the first, second, third and ( $i - 4$ ) differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the k-th order function component so as to generate the component of the k-th order function including no linear component by adding the output signals of the  $i$  differential amplifiers for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the cubic component generating circuit inputted;

a fourth order component generating portion having a fourth order component generating circuit comprising:

a plurality  $j$  ( $j = 4$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant signal outputting circuit for outputting a constant output signal;

a constant level signal generating circuit for providing the constant level signal to each of the  $j$  differential amplifiers, wherein:

first, second, third and fourth differential amplifiers of the  $j$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order;

the output signals of the first and second differential amplifiers and those of the third and fourth differential amplifiers are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of an m-th order function ( $m = 4$ ) on adding up the output signals of the j differential amplifiers; and

the constant signal outputting circuit is constituted to form the output signal of a 0-th order component for offsetting the 0-th order component of the m-th order function component so as to generate the component of the m-th order function including no 0-th order component by adding the output signals of the j differential amplifiers and the constant signal outputting circuit for having the linear input signal inputted and a second variable gain amplifying circuit for having an output signal of the fourth order component generating circuit inputted; and

an adding circuit for adding the output signals of the fourth order component generating portion, the cubic component generating portion, the linear component generating portion and the 0-th order component generating portion ~~according to claim-43~~ for having a detection signal of the temperature detecting circuit inputted.

23. (Currently amended) A temperature compensation crystal oscillation circuit, ~~characterized by comprising~~ comprising ~~[[the]]~~ a temperature function generating circuit comprising a temperature detecting circuit and an approximate fourth order function generating device comprising:

a 0-th order component generating portion for having a constant input signal inputted and generating a constant component;

a linear component generating portion for having a linear input signal inputted and generating a linear component;

a cubic component generating portion having a cubic component generating circuit comprising:

a plurality  $i$  ( $i = 5$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant level signal generating circuit for providing the constant level signal to each of the  $i$  differential amplifiers, wherein:

first, second and third differential amplifiers of the  $i$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of  $(i - 4)$  differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $i$  differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the  $(i - 4)$  differential

amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a k-th order function ( $k = 3$ ) on adding up the output signals of the first, second, third and ( $i - 4$ ) differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the k-th order function component so as to generate the component of the k-th order function including no linear component by adding the output signals of the  $i$  differential amplifiers according to either claim 2 or claim 4 for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the cubic component generating circuit inputted;

a fourth order component generating portion having a fourth order component generating circuit comprising:

a plurality  $j$  ( $j = 4$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant signal outputting circuit for outputting a constant output signal;

a constant level signal generating circuit for providing the constant level signal to each of the  $j$  differential amplifiers, wherein:

first, second, third and fourth differential amplifiers of the  $j$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order;

the output signals of the first and second differential amplifiers and those of the third and fourth differential amplifiers are set to be of mutually reverse polarity; and thus constituted to form the output signal of the component of an m-th order function ( $m = 4$ ) on adding up the output signals of the  $j$  differential amplifiers; and the constant signal outputting circuit is constituted to form the output signal of a 0-th order component for offsetting the 0-th order component of the m-th order function component so as to generate the component of the m-th order function including no 0-th order component by adding the output signals of the  $j$  differential amplifiers and the constant signal outputting circuit for having the linear input signal inputted and a second variable gain amplifying circuit for having an output signal of the fourth order component generating circuit inputted; and

an adding circuit for adding the output signals of the fourth order component generating portion, the cubic component generating portion, the linear component generating portion and the 0-th order component generating portion for having a detecting signal of the temperature detecting circuit inputted according to claim 22 and a crystal oscillation circuit for having the approximate fourth order function generated in the temperature function generating circuit inputted.

24. (Currently amended) A temperature function generating circuit, characterized by comprising a temperature detecting circuit and ~~[[the]]~~ an approximate fifth order function generating device comprising:

a 0-th order component generating portion for having a constant input signal inputted and generating a constant component;

a linear component generating portion for having a linear input signal inputted and generating a linear component;

a cubic component generating portion having a cubic component generating circuit comprising:

a plurality  $i$  ( $i = 5$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant level signal generating circuit for providing the constant level signal to each of the  $i$  differential amplifiers, wherein:

first, second and third differential amplifiers of the  $i$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of ( $i - 4$ ) differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $i$  differential amplifiers has the constant level signal to be



inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the  $(i - 4)$  differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a  $k$ -th order function ( $k = 3$ ) on adding up the output signals of the first, second, third and  $(i - 4)$  differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the  $k$ -th order function component so as to generate the component of the  $k$ -th order function including no linear component by adding the output signals of the  $i$  differential amplifiers for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the cubic component generating circuit inputted;

a fourth order component generating portion having a fourth order component generating circuit comprising:

a plurality  $j$  ( $j = 4$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant signal outputting circuit for outputting a constant output signal;

a constant level signal generating circuit for providing the constant level signal to each of the  $j$  differential amplifiers, wherein:

first, second, third and fourth differential amplifiers of the  $j$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order;

the output signals of the first and second differential amplifiers and those of the third and fourth differential amplifiers are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of an  $m$ -th order function ( $m = 4$ ) on adding up the output signals of the  $j$  differential amplifiers; and

the constant signal outputting circuit is constituted to form the output signal of a 0-th order component for offsetting the 0-th order component of the  $m$ -th order function component so as to generate the component of the  $m$ -th order function including no 0-th order component by adding the output signals of the  $j$  differential amplifiers and the constant signal outputting circuit for having the linear input signal inputted and a second variable gain amplifying circuit for having an output signal of the fourth order component generating circuit inputted;

a fifth order component generating portion having a fifth order component generating circuit comprising:

a plurality  $i$  ( $i = 6$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant level signal generating circuit for providing the constant level signal to each of the  $i$  differential amplifiers, wherein:

first, second and third differential amplifiers of the  $i$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of  $(i - 4)$  differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $i$  differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the  $(i - 4)$  differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a  $k$ -th order function ( $k = 5$ ) on adding up the output signals of the first, second, third and  $(i - 4)$  differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the k-th order function component so as to generate the component of the k-th order function including no linear component by adding the output signals of the i differential amplifiers for having the linear input signal inputted and a third variable gain amplifying circuit for having an output signal of the fifth order component generating circuit inputted; and

an adding circuit for adding the output signals of the fifth order component generating portion, the fourth order component generating portion, the cubic component generating portion, the linear component generating portion and the 0-th order component generating portion according to claim 14 for having a detection signal of the temperature detecting circuit inputted.

25. (Currently amended) A temperature compensation crystal oscillation circuit, ~~characterized by~~ comprising ~~[[the]]~~ a temperature function generating circuit comprising a temperature detecting circuit and ~~[[the]]~~ an approximate fifth order function generating device comprising:

a 0-th order component generating portion for having a constant input signal inputted and generating a constant component;

a linear component generating portion for having a linear input signal inputted and generating a linear component;

a cubic component generating portion having a cubic component generating circuit comprising:

a plurality i ( $i = 5$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level

inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant level signal generating circuit for providing the constant level signal to each of the  $i$  differential amplifiers, wherein:

first, second and third differential amplifiers of the  $i$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of  $(i - 4)$  differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $i$  differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the  $(i - 4)$  differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a k-th order function ( $k = 3$ ) on adding up the output signals of the first, second, third and ( $i - 4$ ) differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the k-th order function component so as to generate the component of the k-th order function including no linear component by adding the output signals of the  $i$  differential amplifiers for having the linear input signal inputted and a first variable gain amplifying circuit for having an output signal of the cubic component generating circuit inputted;

a fourth order component generating portion having a fourth order component generating circuit comprising:

a plurality  $j$  ( $j = 4$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant signal outputting circuit for outputting a constant output signal;

a constant level signal generating circuit for providing the constant level signal to each of the  $j$  differential amplifiers, wherein:

first, second, third and fourth differential amplifiers of the  $j$  differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order;

the output signals of the first and second differential amplifiers and those of the third and fourth differential amplifiers are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of an m-th order function ( $m = 4$ ) on adding up the output signals of the j differential amplifiers; and  
the constant signal outputting circuit is constituted to form the output signal of a 0-th order component for offsetting the 0-th order component of the m-th order function component so as to generate the component of the m-th order function including no 0-th order component by adding the output signals of the j differential amplifiers and the constant signal outputting circuit for having the linear input signal inputted and a second variable gain amplifying circuit for having an output signal of the fourth order component generating circuit inputted;

a fifth order component generating portion having a fifth order component generating circuit comprising:

a plurality i ( $i = 6$ ) of differential amplifiers for having a common linear input signal inputted to one input terminal, having a constant level signal of a predetermined level inputted to the other input terminal, outputting an reversed or non-reversed signal to the linear input signal and having a limiter function of limiting an output signal to predetermined maximum and minimum values; and

a constant level signal generating circuit for providing the constant level signal to each of the i differential amplifiers, wherein:

first, second and third differential amplifiers of the i differential amplifiers are set to have the constant level signals at increasingly higher levels inputted in order, and the output signals of the first and third differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity;

a fourth differential amplifier of the  $i$  differential amplifiers has the constant level signal to be inputted set as the signal at the same level as the constant level signal to be inputted to the second differential amplifier, and has the output signal thereof set to be of the same polarity as the output signals of the first and third differential amplifiers and also has a range of the input signal to be the maximum value and the input signal to be the minimum value set larger than that of the second differential amplifier;

each of  $(i - 4)$  differential amplifiers other than the first, second, third and fourth differential amplifiers of the  $i$  differential amplifiers has the constant level signal to be inputted set to be either lower than a level of the constant level signal to be inputted to the first differential amplifier or higher than a level of the constant level signal to be inputted to the third differential amplifier, and the output signals of the  $(i - 4)$  differential amplifiers and those of the second differential amplifier are set to be of mutually reverse polarity; and

thus constituted to form the output signal of the component of a  $k$ -th order function ( $k = 5$ ) on adding up the output signals of the first, second, third and  $(i - 4)$  differential amplifiers; and

the fourth differential amplifier is constituted to form the output signal of a linear component for offsetting the linear component of the  $k$ -th order function component so as to generate the component of the  $k$ -th order function including no linear component by adding the output signals of the  $i$  differential amplifiers for having the linear input signal inputted and a third variable gain amplifying circuit for having an output signal of the fifth order component generating circuit inputted; and



an adding circuit for adding the output signals of the fifth order component generating portion, the fourth order component generating portion, the cubic component generating portion, the linear component generating portion and the 0-th order component generating portion for having a detection signal of the temperature detecting circuit inputted according to claim 24 and a crystal oscillation circuit for having the approximate fifth order function generated in the temperature function generating circuit inputted.

26. (Currently amended) A temperature compensation adjustment method, ~~characterized in that~~ comprising, when making a temperature compensation adjustment to a temperature compensation crystal oscillation circuit comprised of a temperature compensation circuit including a temperature detecting circuit and an approximate n-th order function generating device (n is an integer of 3 or more) and a voltage-controlled crystal oscillation circuit, making a measurement ~~is made~~ on an n-th order component  $VC_{OUTn}$  to a 0-th order component  $VC_{OUT0}$  of an output voltage  $VC_{OUT}$  of the temperature compensation circuit in a predetermined temperature atmosphere, and also making measurements ~~are also made~~, at a plurality of temperatures in a desired temperature compensation range, on an input voltage  $VC_{IN}$  at which an oscillating frequency outputted from the voltage-controlled crystal oscillation circuit matches a preset selected frequency, ~~[[and]]~~ wherein the n-th order component  $VC_{OUTn}$  of the output voltage  $VC_{OUT}$  measured at each temperature is approximated as a function of a temperature T by:

$$VC_{OUTn}'(T) = VC_{OUTn}(T) - VC_{OUT0}(T),$$

and the output voltage  $VC_{OUT}$  is described as a function of the temperature T by:

$$VC_{OUT}(T) = \alpha_n VC_{OUTn}'(T + \Delta T) + \dots$$

$$+ \alpha_3 VC_{OUT3}'(T + \Delta T) + \alpha_1 VC_{OUT1}'(T + \Delta T)$$

$$+ VC_{OUT0}'(T + \Delta T) + \alpha_0,$$

and coefficients  $\alpha_n$  to  $\alpha_3$ ,  $\alpha_1$ ,  $\alpha_0$  and  $\Delta T$  of the temperature compensation circuit are adjusted so that the input voltage  $VC_{IN}$  and the output voltage  $VC_{OUT}$  measured at each of the temperatures are matching.

27. (New) The approximate cubic function generating circuit according to claim 12, wherein a fifth differential amplifier has the constant level signal to be inputted set to be higher than the level of the constant level signal to be inputted to the third differential amplifier and also has the range of the input signal to be the maximum value and the input signal to be the minimum value set smaller than that of the third differential amplifier.

28. (New) The approximate fourth order function generating circuit according to claim 13, wherein a fifth differential amplifier has the constant level signal to be inputted set to be higher than the level of the constant level signal to be inputted to the third differential amplifier and also has the range of the input signal to be the maximum value and the input signal to be the minimum value set smaller than that of the third differential amplifier.

29. (New) The approximate fifth order function generating circuit according to claim 14, wherein a fifth differential amplifier has the constant level signal to be inputted set to be higher than the level of the constant level signal to be inputted to the third differential amplifier and also has the range of the input signal to be the maximum value

and the input signal to be the minimum value set smaller than that of the third differential amplifier.